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SCIENCE NEWS LETTER

SEP 13 1937

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

September 11, 1937

Feathered Romance

See Page 167

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The Weekly Summary of Current Science

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DO YOU KNOW?

The great majority of babies are well when they are born.

There are 21 species of the tsetse fly in Africa.

Reversing usual tree habits, the sycamore tree peels in summer and acquires its new bark in winter.

British telephone booths and mail boxes are now painted red, so they can be located more easily.

In constructing a glass office building for itself, a New York glass manufacturing company has used 25 varieties of glass.

Huge quantities of water required for air-conditioning systems have created a new problem in providing adequate sewers.

The fact that the moon is just large enough to cover the sun from view in an eclipse is, for astronomers, "a fortunate coincidence."

Mammoth Cave's now famous pre-Columbian mummy is exhibited to tourists in an air-tight, waterproof, rustproof case.

There are 91 varieties of trees in the White House gardens.

A series of ten films for use in teaching high school chemistry is being made.

Last year 800 bicyclists were killed as a result of collisions with automobiles, in the United States.

Female elephants calve, it is believed, about once in two years, and a normal female produces a dozen or so young elephants in a lifetime.

New Guinea has the largest known butterflies—beautiful creatures of green, black, and gold, with wingspread of 11½ inches.

Catacombs of the early Christian era have been discovered five miles from Nazareth, with inscriptions and pictures still preserved in them.

In Connecticut, motorists over 30 years old with good driving records, can apply for license plates bearing their initials or the first three letters of their names, instead of the usual numerals—so long as the same combination of letters has not been granted another person.

WITH THE SCIENCES THIS WEEK

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ASTRONOMY

Super-Nova is 500,000,000 Times Brighter Than Sun

Giant Exploding Star Is in Small Stellar System About Three Million Light Years From Our Galaxy

A GIGANTIC stellar explosion, producing 500,000,000 times as much light as the sun, and announced as the sixteenth super-nova of all history, was discovered at the Palomar Mountain observatory of the California Institute of Technology.

This new star, so distant that it has taken its light about three million years to reach the earth, has burst from an obscurity that could barely be pierced by the most powerful telescopes to take its place among the brighter stars. It is situated roughly midway between the Big Dipper and bright star Arcturus in the northern sky. It is not quite bright enough to be seen with the unaided eye.

Spectrographically Checked

The discovery was made by Dr. Fritz Zwicky. It was confirmed by observations of the super-nova's spectrum made at the Mt. Wilson Observatory of the Carnegie Institution of Washington by Milton Humason and was further studied by Dr. Walter Baade.

If such a stellar explosion happened in the vicinity of the earth and sun and its planets, it would undoubtedly wipe them out.

"The appearance of a super-nova in any given system of stars, such as our own, for example, is a very rare occurrence which happens perhaps only once in several hundred years," Dr. F. H. Seares of the Mt. Wilson Observatory pointed out. "Of the numerous novae that have appeared in our own system, only one, Tycho's star of 1572, was perhaps bright enough to be classed as a super-nova. For that reason search has turned to the extragalactic systems of stars, of which many thousand are bright enough to serve as a means of increasing the chance of discovering one of these catastrophic outbursts."

Dr. Zwicky's discovery results from a systematic plan for the detection of the outburst of these amazing objects which at their maximum brightness far surpass the luminosity of any other type of star.

There is no trace of the nova on a Mt. Wilson photograph taken March 8, 1937, from which it is certain that before the outburst the star was fainter than the twentieth magnitude, which is not far from the limit than can be reached with the 100-inch telescope. Now it is of magnitude 8.5, an increase in brightness of at least 40,000 times. The system within which the super-nova has appeared is small, a dwarf stellar system, in fact, situated at about three million light years and so faint as to be observable only with the most powerful telescopes. Dr. Baade estimates the intrinsic brightness of the super-nova to be of absolute magnitude minus 16.3, which is some ten times brighter than average super-nova and about 100 times more luminous than the nebula to which it belongs, or 500,000,000 times the luminosity of the sun. It is the most luminous of all the 15 super-novae thus far observed with the possible exception of Z Centauri of 1895.

Theory of Cosmic Rays

Researches now in progress may soon prove, or disprove, the controversial theory that the source of the mysterious cosmic rays is the gigantic explosion of stars in space. Cosmic ray instruments aimed at the new super-nova just discovered by Prof. Zwicky at Palomar Observatory in California may be showing right now that the intensity of cosmic rays has increased during the recent flareup of the super-nova which is said to rival 500,000,000 suns in brilliance.

If the cosmic ray intensity does increase in the direction of the new super-nova, it would be good support for Prof. Zwicky's own theory on the origin of cosmic rays, which assigned tremendous star explosions as the source of the piercing radiation. Prof. Zwicky first postulated with Dr. Walter Baade this hypothesis in 1934.

Since then at least one super-nova has been discovered, in the constellation of Virgo, but it was so small and far away (6,000,000 light years) that conclusive results in testing the cosmic ray theory of Prof. Zwicky were not anticipated.

The present super-nova, however, is only half as far away and is among the brightest star explosions yet seen among the 16 known to astronomy. While its position, roughly between the Big Dipper and the star Arcturus, is not too favorable for cosmic ray directional observations because of the bending effect of the earth's magnetic field on incoming electrical particles, the chances of checking the Zwicky theory are much better than during the similar 1936 super-nova.

The next few days of cosmic ray observations may tell the story.

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ANTHROPOLOGY

Eskimo-Zulu Marriage Produces Unique Offspring

KUPLOO is a lad about sixteen Arctic summers old. He lives near Churchill, far up the coast of Hudson Bay. And he has probably the most incredible parental assortment that any of old earth's racial melting-pots can boast. His father is an Eskimo, his mother a Zulu.

It happened in this wise: The Hudson Bay Company's agents at Churchill, on Hudson Bay, found a big deposit of blue clay, that looked like the stuff they take diamonds out of, down in South Africa. They asked the South African diamond people if they could send up a good diamond prospector. A skilled Zulu

ZULIMO OR ESKILU?

prospector was sent, and he brought his wife with him. There turned out to be no diamonds after all, but before the Zulu couple could get a boat back home the man fell sick and died.

The woman, not caring to go back to her people a widow, remained in the North and married an Eskimo. Kuploo, now about 16 years old, is their child.

Like a good many boys of his age, he is rather bashful and didn't want to have his picture taken, so Père Arthéme Dutilly, Canadian missionary-scientist, asked him to hold up a bird he had just shot for his collection. It didn't occur to Kuploo until the operation was all over that he would also be included in the picture.

Science News Letter, September 11, 1937

PHYSICS

Giant New Atom-Smasher Uses 2,700,000 Volt Potential

Apparatus Enclosed in High-Pressure Tank To Cut Down Sparking and Corona Discharges

THE HIGHEST steady operating potential ever used in atom bombardment research is attained in the new 2,700,000 volt electrostatic generator with which physicists at the University of Wisconsin are now exploring the nuclei of atoms.

Sealed in a giant steel tank under a pressure which can be as high as 100 pounds to the square inch, the Wisconsin apparatus has already made possible the discovery of powerful gamma radiation, excelling in piercing power the rays from radium, which is liberated when fluorine is bombarded in the apparatus. The medical implications of this discovery, in the treatment of cancer and other malignant diseases, are yet undeveloped but offer a promising field of research.

Drs. Raymond G. Herb, D. W. Kerst and D. B. Parkinson are the scientists who have fashioned, and now operate, the new tool of atomic research which operates steadily at 2,500,000 volts. The experimenters are assisted, in the theoretical implications of their discoveries, by the well-known mathematical physicist Dr. Gregory Breit, also of the University of Wisconsin.

The virtue of the Wisconsin apparatus, Dr. Breit told Science Service, is that it gives a high, steady and controllable voltage with which particle "bullets," like protons, can be driven at atoms under investigation.

The device, of the electrostatic type, differs from the famous cyclotron apparatus used at the University of California in about the same way that a rifle differs from a shotgun. The cyclotron can apply equal or greater energies to its particles but may not supply them in a steady stream with every particle in the stream having the same energy. Like a shotgun, a cyclotron can be said to spray bullets of different energies at the target.

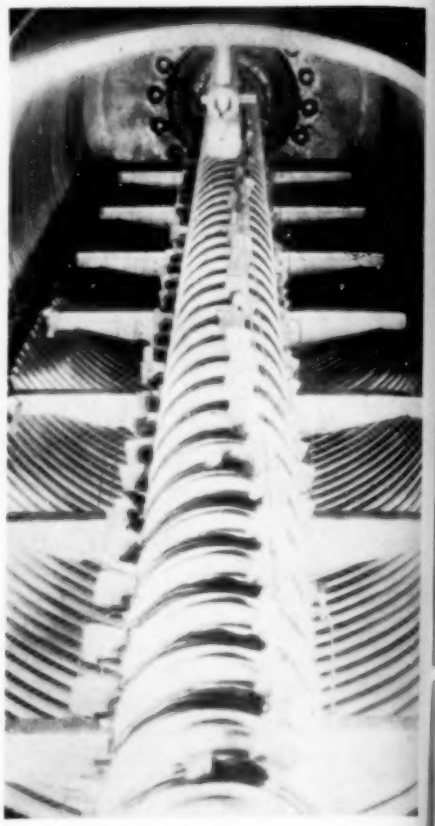
Moreover, as now used, electrostatic generators have methods of determining the energies of their particles by external means, without actually going into the bombarding particle beam (as the cyclotron investigators must do) to measure the energies of the particles.

In contrast to cyclotrons, the Wisconsin apparatus, to keep the analogy, would be a rifle which shoots its bullets with known and readily controllable energy. For many vital experiments in atomic physics, it is most important that the energy of all the particles be quite the same and their energy accurately known.

Typical of an experiment where such knowledge is vital, is that of measuring the binding force in the nuclei of hydrogen atoms. The fundamental results of this new, powerful force of nature and knowledge of the laws by which it acts, were first secured at the Department of Terrestrial Magnetism of the Carnegie Institution of Washington with the electrostatic atom-smasher of Drs. Tuve and Hafsted and their colleagues.

Already work at Wisconsin, not yet officially reported, indicates that the basic curves obtained in this earlier work will be substantiated with great accuracy, and extended into the new ranges of energy which the Wisconsin device can attain.

The function of the steel pressure tank, enclosing the Wisconsin apparatus, is to reduce markedly the corona discharge and electrical spark-over at the very high electrical potentials employed. While it might seem that this is a new idea—from the number of similar devices now being built elsewhere—it is not.



ATOMIC RIFLE-RANGE

Down this long porcelain tube speed the atomic "bullets," in the University of Wisconsin's new atom-smashing machine.

The idea of a pressure tank was in nearly all the investigators' minds as the way to accomplish the best operating conditions. The apparent delay arose from the need for much experimental spade work in learning how to construct and operate satisfactorily the electrostatic type of generator.

This knowledge has now been achieved, so that besides the Wisconsin device, operating at pressures of 100 pounds to the square inch, there is now building the Westinghouse apparatus which will have pressures of 120 pounds to the square inch. And in Washington a tank with 50 pounds to the square inch pressure is under construction which will house a new generator.

Also, Dr. Robert Van de Graaff of the Massachusetts Institute of Technology, who was the first of the modern scientists to apply to the problems of atomic bombardment the electrostatic method

of the last century, has now dismantled his huge generator and taken it to Cambridge where it will be housed in a pressure tank. The giant airship hangar at Round Hill, Mass., formerly used, will be abandoned for its research purposes. Dr. Van de Graaff's pioneer giant instrument has served valuably in helping to show needed changes in construction methods and operating techniques which can only be learned after equipment has been built.

Dr. Herb, at Wisconsin, has announced that a very small amount of carbon tetrachloride—familiar as a cleaning fluid—has aided in improving the operating characteristics of his apparatus. It has been suggested that the vapor will break up in the presence of ionization in the tank and that the chlorine part serves to turn swift-flying electrons in the apparatus into slow-moving, larger ions. Thus the rapidity of spark-over is diminished and better operation secured.

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MYCOLOGY

Mushrooms Grown in Air-Conditioned Houses

MUSHROOMS grown in air-conditioned houses are the newest offering for gourmets' tables. Near West Chester, Pa., thirty growing houses have been fitted with apparatus to control the temperature and humidity and by that means to increase the mushroom yield from two crops to three. Previously the houses were shut down during the summer months because hot weather produced inferior mushrooms.

Control of temperature and humidity marks another chapter in the art of mushroom growing, one of the world's most specialized crafts. Parisian mushroom growers long ago found a partial solution to the problems of variable temperature and humidity by placing their growing beds in galleries and cellars from 60 to 160 feet below the surface of the ground.

Credit for the suggestion to apply air-conditioning to mushroom-growing goes to William E. Chambers, vice-president of the Grocery Products Manufacturing Corporation.

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England became a tea drinking country because of its Oriental trade and tea plantations, whereas Holland and France took to coffee because of their coffee plantations in the Indies.

CHEMISTRY

Milk: Its Whence and Whither Discussed at Chemists' Meeting

Chemistry of Other Foods and Their Health Importance Are Increasing Concern of Members of Profession

CHEMISTS are looking into cows, nowadays. Pioneer research that may open the road to learning how milk is made was reported before the annual meeting of the American Chemical Society in Rochester, N. Y., by Drs. Ross A. Gortner and Stanley M. Jackson of the University of Minnesota.

Great changes in the relative amounts of different proteins were found in the mammary glands of heifers, "fresh" cows, and "dry" cows, they declared.

In what was described as the first real attack on the problem of how milk is secreted, they reported that albumins —proteins such as the white of egg which are soluble in water and which are coagulated by heat as in boiling an egg—decreased very sharply when the glands became active. Similarly globulins, another type of protein, increase in amount.

"Just what the changes mean, insofar as the synthesis of proteins in milk are concerned, still remain to be worked out, but this study does show that when the gland becomes active there are major changes in the physical state of the proteins making up the glandular tissue," they concluded.

Making Smaller Curds

By adding enzymatic extract of hog's pancreas, cow's milk curds can be made small enough closely to approximate the curds in human milk, Dr. Victor Conquest and his colleagues of Armour and Company reported. In the past, cow's milk that was to be fed to babies had to be diluted with water and lactose in order to make the digestion of its relatively large curds easy for an infant's stomach.

"The method of preparing this product is identical with the pasteurizing processes except that a slight incubation period for the milk after it has been mixed with a small amount of dried enzymatic extract of the hog pancreas has proven to be successful," Dr. Conquest explained.

Nutritive qualities of the milk are not affected by the treatment, which is easily carried out on a large scale, it was indicated. "The purpose of our investigation has been to reproduce such a milk in a manner that will not take away any of the valuable constituents of normal cow's milk, the method of which will be fast and the resulting product such that it will produce a flaky curd in the stomach and which will give a curd tension reading low enough to be classified as a soft curd milk."

Pint a Day Sufficient

To get an adequate amount of calcium for bone building, children need only a pint of milk a day, not a quart as has been sometimes claimed. This is the verdict of a study of five University of Illinois scientists, presented in a report to the chemists. More milk would be needed by a child who has been underfed or improperly fed, however, they emphasized, in order to make up for past deficiency.

The verdict, Miss Julia Outhouse, one of the five scientists, explained, is based on how much calcium a child can absorb in order to build its bones and its teeth. Other food requirements which a larger milk supply would fill can be obtained from other than milk sources.

Results of the Illinois experiments are said to be the nearest approach to determining scientifically how much milk children should have. Associated with Miss Outhouse in the study were Gladys M. Kinsman, Millicent L. Hathaway, and Janice M. Smith of the University's Department of Home Economics, and H. H. Mitchell, chief in animal nutrition.

Only one-fifth of the calcium in milk solids can be used by growing children who were well nourished with respect to all other known food requirements.

Five little girls, ranging between three and a half and five years of age, were used in the experiment. The average daily calcium requirement was found to be seven milligrams per kilogram of

KIN OF MOUNTAIN GOAT AND CHAMOIS

The takin, one of the most difficult to hunt of Asiatic animals, is the subject of a new habitat group recently opened to public view at Field Museum of Natural History in Chicago. In the group are five specimens ranging from young calf to old buck, mounted in lifelike attitudes amid a scene representing their mountainous home. The specimens were collected by the Marshall Field Zoological Expedition to China under the leadership of Floyd T. Smith. The group was prepared for exhibition by Staff Taxidermist Julius Friesser and his assistant Frank C. Wonder, and has a background by Staff Artist Charles A. Corwin.

body weight, or 114 milligrams altogether for the average child, whose weight was 16.5 kilograms (a little more than thirty-six pounds).

This much calcium would be absorbed from one pint of milk per day, the researchers pointed out.

Because most parents would not know clearly and safely that their children did already receive a sufficient amount of calcium, it is probable that a standard quart of milk, daily, might well be the best rule for the layman. This was the unofficial comment of scientists who heard the Illinois report.

Specific enzymes do not cause the richer flavor of milk during the winter, contrary to general chemical opinion, George R. Greenbank of the U. S. Bureau of Dairy Industry stated. Its richer flavor is due to changes in oxidation and reduction of substances in the milk, he declared.

Contentment and milk of unblemished flavor are the lot of cows pastured near a certain rayon knitting mill as a result of a novel, but cheap and efficient method of treating waste products of the plant.

Oil and soap from the knitting mill, Dr. Foster Dee Snell, New York chemical engineer, reported, were troubling nearby farmers. They declared that milk from their cows, which drank from the turbid stream into which the waste had been drained, had an objectionable taste.

Running the waste through a bed of ashes from the plant, Dr. Snell found, removed the soap and oil and turned the stream crystal clear. Secret of the success was that the ashes contained calcium chloride. Calcium compounds in the ashes, Dr. Snell explained, removed the soap from the waste, and with it the oil. Rayon for knitting is treated with oil to make it handle more easily; after the knitting process is finished, soap is added and the soap and oil boiled off together.

Raw food lovers haven't as great a Vitamin C advantage as is commonly supposed over their softer-toothed fellows who prefer their vegetables cooked.

Proper methods of cooking, Dr. Donald K. Tressler, head of the chemistry department of the New York State Agricultural Experiment Station at Geneva, pointed out, cause the loss of only a small portion of scurvy-preventing vitamin C, contrary to the general belief.

Applesauce made from Northern Spy apples, which have a high vitamin content, contains two-thirds as much vitamin C as the raw apples, Dr. Tressler and his colleagues, Miss Katherine M. Curran and Prof. Charles G. King of the University of Pittsburgh, reported. Their statements were based on extensive experiments.

Little vitamin C is lost in peeling the apples, they also pointed out, despite popular belief to the contrary. But apple pie, particularly when stale, contains only a small residue of vitamin C.

Previous investigators have been led to believe that cooking lowers the vitamin C content of food by the fact that they measured the content of only the cooked vegetable itself, neglecting to study the juices.

"It is probable that this idea became prevalent because but few nutritional investigators took into consideration the amount of the vitamin which dissolved in the cooking water. The fact that the water in which vegetables, rich in vitamin C, have been cooked may be as rich in this vitamin as tomato juice is of great importance," Dr. Tressler stated.

Stomach ulcers, produced artificially in laboratory rats, can be controlled by a rich diet in proteins such as lean meat. Laboratory animals were first fed acids and pepsin, a digestive juice, to induce stomach ulcers and then fed a diet which prevented the ulcers from actually forming.

Fasting Essential

Earlier experiments indicated that a period of fasting was necessary to induce the ulcers, for animals fed a standard diet—after being fed the acid-pepsin mixture—did not develop ulcers. Controlled diet tests named proteins such as casein, gelatin, and lean meat as the substances preventing the ulcers from forming. The tests were conducted by Drs. Milton J. Matzner and Charles Windwer and Albert E. Sobel of the Brooklyn, N. Y., Jewish Hospital.

Previous work in blood chemistry and earlier ideas about the way in which the red blood corpuscles carry oxygen to the tissues will have to be revised in the light of an unexpected discovery, Prof. T. R. Hogness of the University of Chicago declared.

Body salts markedly decrease the oxygen carrying-capacity of the blood's hemoglobin, Prof. Hogness reported. The effect had not been suspected before and interpretations of the way in which the blood does its work had not considered this effect, he added.

Bicarbonate of soda and other salts normally present in the blood cut down the ability of hemoglobin to combine

with oxygen by more than 90 per cent., he reported. Oxygen at one millimeter pressure saturates salt-free hemoglobin solutions to the extent of 50 per cent. When body salts are present the saturation is cut to one or two per cent. The greater the salt concentration of the blood, the harder it is for the hemoglobin to store and transport oxygen.

Bicarbonates exhibit this effect to the greatest degree, with phosphates, citrates, sulfates and chlorides exhibiting the effect in reduced degree.

"Much of the previous work on hemoglobin must now be re-interpreted or re-investigated, due to this unforeseen factor of the salt inhibition," he concluded.

Iron Alone No Help

New light on the nature and treatment of anemia, the dread blood disease, is indicated by results of "synthetic nutritional anemia" induced in rats by a special diet. When anemic young rats fed on a milk-and-iron diet were given additional iron "rations" in their food, no significant improvement was noted unless copper was also present in their diet, Dr. W. H. Summerson of the Cornell University Medical School declared. But if copper was added, rapid improvement in the condition of the laboratory animals was noted.

More than normal quantities of iron are present in the blood serum, as distinguished from the red blood corpuscles, during blood diseases such as pernicious anemia, Prof. Burnham S. Walker of the Boston University School of Medicine stated. Iron content in the form of red blood corpuscles decreases markedly during pernicious anemia and other blood diseases. Adaptation of an iron-determination method developed for other uses was the principal point in Dr. Walker's research.

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ORNITHOLOGY

Heron in New York Zoo Has Long Lease on Life

See Front Cover

HERONS, of whatever species, are invariably beautiful; and the idyllic little scene shown on the front cover of this issue of the SCIENCE NEWS LETTER adds a touch of feathered romance to the beauty.

But alas! the idyll was shattered. One of the pair died, and the widowed survivor was alone.

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CHEMISTRY

Lighter Cars, Longer Mileage, Is Chemists' Vision of Future

SMALLER automobile engines getting more miles per gallon on new super-fuels were envisioned in a report before the meeting of the American Chemical Society at Rochester, N. Y.

Re-shaping of the molecules, tiny building blocks of nature that make up the gasoline, is the means of reaching the goal of these super-fuels, W. G. Lovell and J. M. Campbell of the General Motors Corporation research laboratory revealed.

Small quantities of these high test super-fuels have been made for use in airplane engines operating under extremely severe conditions and in the laboratory.

"The laboratory experiments show that fuels can be made of great effectiveness when we learn more about how to do it on a commercial scale."

Connected With Knock Problem

The problems of better fuels, the scientists explained, is closely connected with the problem of the motorist's greatest curse, engine knock.

"Automotive engineers have long known that if they increased the compression ratio of an engine they got more power and economy out of it. It was something they wanted to do, but if they tried it, then they found that the engine would knock on the available gasoline, so that what they wanted to do they couldn't do."

The super-fuels predicted by the two chemists would solve this problem which has baffled automotive engineers, it was indicated.

"But it was found that not all gasolines were alike in this respect,"—some knocked less than the others. "Chemical research has found out why. It is because of the shape of the molecules in the gasoline. If a molecule has a long stringy shape, it knocks badly; but if a molecule of the same size is arranged compactly, more like a ball, then it makes a fine fuel.

"The difference between these two types of molecules of the same size is so great that a fuel made of one may give 50 per cent. more power in a suitable engine than another," they continued.

"True, both would give the same amount of heat in an oil furnace, for instance, but because one may be burned in an engine with higher compression ratio, without knock, it will give much more power there."

Common table salt, sodium chloride, in pure form would be precipitated in tremendous quantities if the Great Salt Lake of Utah evaporated to one-fourth its present size, Prof. Walter D. Bonner of the University of Utah told the Society.

Salt was actually precipitated from the briny inland sea during parts of the drought summers of 1934, 1935 and 1936, Prof. Bonner reported. He presented an analysis of the lake prepared by himself and four colleagues, R. D. Twelves, G. S. Winn, George Cronkhite and Elizabeth Sheldon.

Great Salt Lake, with an area of 1600 square miles and an average depth of thirteen feet, is a shallow residue of a giant freshwater lake, Lake Bonneville, that covered this region of America in prehistoric times, he explained.

The salt concentration of the lake has varied over a long period of years from 15 to 30 per cent. Thirty per cent. is the maximum concentration of salt that will remain in solution. When evaporation, during the drought months of the last few years, began removing water salt was precipitated from the brine. Average "saltiness" of the lake is 28 per cent., the chemist stated.

Glauber's Salt in Lake

Sodium sulphate or Glauber's salt, used as a medicine, is found in relatively large quantities in the lake, the chemists reported. Since Glauber's salt is much more soluble in warm water than in cold water, winter months frequently see the formation of pure sodium sulphate crystals.

The first 30 per cent. of the salt to be crystallized out of the lake by evaporation would be pure sodium chloride, Dr. Bonner explained. The next 30 per cent. would contain small amounts of other salts also present in the famous inland sea. "The greater part of the salts except sodium chlo- (*Turn to Page 170*)

PSYCHOLOGY

Chimpanzees Can Become Addicted to Morphine

CHIMPANZEES can become addicted to morphine so that even when they are very hungry they prefer taking the drug to eating a choice morsel of food, Dr. S. D. Shirley Spragg, of the Yale Laboratories of Primate Biology told the meeting of the American Psychological Association.

This finding at Yale's experiment station seriously challenges the theory that human addiction to opiates is "psychic" and due to abnormal personality or to the "strains of civilization."

Very important to the scientists studying drug addiction and trying to find cure or preventive for it, is the discovery that the man-like apes fall victim to the drug in very much the same way that humans do. Lower animals, even dogs and monkeys show some of the symptoms of morphine addiction; they become physiologically dependent upon it. But these animals do not show an active desire for the drug, as do the chimpanzees.

The chimpanzees, after taking morphine for a few months, will run with great eagerness to the room where the drug is administered and throw themselves across the experimenter's knee for the injection. They will fly into a rage and scream if the experimenter attempts to lead them back to the cage without first giving them the drug. Most striking was the test in which hungry animals discarded their treat of fruit in favor of the drug they craved.

Science News Letter, September 11, 1937

PHYSICS

Sugar Cane Boards Are Stronger Than Wood Ones

NEWEST building aid for America's homes is synthetic sugar cane building board that is stronger than wood and offers three times the heat insulating qualities.

In tests by the Department of Civil Engineering of Columbia University, the new sheathing board proved to be 28 per cent. stronger than ordinary diagonal wood sheathing and 330 per cent. stronger than horizontal wood sheathing.

The material is cheaper than wood and is made of a by-product of sugar cane known as bagasse. In appearance the sheathing boards come in large panels, one inch thick, four feet wide and twelve feet long. They are coated with a black asphalt layer which prevents the penetration of moisture and one side is sprayed with a thin aluminum coating. The porous nature of the material supplies the air spaces which make it resistant to the transmission of heat.

Bagasse fibers lend themselves to the construction of the building board, for each fiber has innumerable tiny hairs or thorns which interlock with those of other fibers. Thus no binder is needed to give the board strength and rigidity.

The bagasse material is obtained from sugar cane stalks after they are crushed, cooked, digested, cured and cleaned. When the bagasse is separated, it is treated chemically to supply resistance to water, rot, termites, fungi and vermin.

The properties of the material also lend themselves to packing cases for shipments destined for tropical countries. A motion picture company, headed for Samoa, shipped its equipment in such cases and the containers successfully resisted the ravages of pests. Wooden packing cases are sometimes devoured in transit to tropical regions by termites.

After the recent Columbia University tests, the Building Department of the City of New York accepted the material as a substitute for wood in frame construction. The Celotex Corporation developed the process for making the sheathing board.

Science News Letter, September 11, 1937

SEISMOLOGY

Ocean Bottom Shaken In New Zealand Region

A STRONG earthquake shook the bottom of the Pacific Ocean near the Kermadec Islands, about 800 miles northeast of Wellington, New Zealand, on Wednesday, Sept. 1. Location of the epicenter was determined by seismologists of the U. S. Coast and Geodetic Survey on the basis of telegraphic data transmitted through Science Service.

The epicenter was in approximately 31 degrees south latitude, 179 degrees west longitude. Time of origin was 8:38.9 p. m., New Zealand time. Stations reporting were those of the U. S. Coast and Geodetic Survey at San Juan, P. R., Honolulu, H. T., and Sitka, Alaska, and those of the Jesuit Seismological Association at Fordham University, New York City, and Weston College, Mass.

Science News Letter, September 11, 1937

IN SCIE

ENTOMOLOGY

Permanently Juvenile Insect Found in Florida

"PETER PAN" among insects, a species that never grows up, has been discovered in a ravine in northwestern Florida by Prof. Theodore H. Hubbell of the University of Florida.

The curious creature is a grouse locust that remains in its nymphal or infantile form all its life, never producing wings like the rest of its kindred. It matures only sexually, so that the species may be perpetuated.

This kind of permanent infantilism is not unknown among animals, though it is rather rare. It has never before been observed in the particular group studied by Prof. Hubbell.

The nearest relatives of the new species are found in Central America; but they are ordinary normally winged insects.

Science News Letter, September 11, 1937

PSYCHOLOGY

Optical Illusions Possible To Totally Blind Persons

BLIND persons can have optical illusions.

The odd way that your eye can fool you into thinking that upright lines are taller than horizontal lines or that parallel lines converge in the distance is duplicated by the "seeing" fingers of the blind, psychologists at the meeting of the American Psychological Association were informed, in a report by Dr. C. H. Bean, of Louisiana State University.

Figures like those ordinarily used to illustrate common optical illusions were given to a group of totally blind children and grown-ups, all but three of whom had been blind from birth. The lines of the figures were in relief so that the blind could feel them out.

The same illusions were experienced by these blind persons by means of touch that seeing persons experience through their eyes. Seeing persons, however, do not have these illusions by touch.

Science News Letter, September 11, 1937

E FIELDS

PHYSIOLOGY

Horse-Racing Responsible For Dope-Detecting Method

A NEW and improved method of detecting minute quantities of morphine has been developed as a by-product of the horse racing business.

New York State racing commission experts, charged with keeping racing honest by making sure horses were not "doped" prior to races, reported having difficulty with oxidation of morphine while analyzing samples of saliva from horses they believed had been doped.

Charles E. Morgan, commission chemist, worked out the new method, which prevents oxidation of the morphine in the sample, as an answer to the problem.

Science News Letter, September 11, 1937

PUBLIC HEALTH

Yellow Fever Vaccination Given to Plane Crews

ALL FLYING personnel on planes of two airlines operating between the United States and South American countries are being vaccinated as rapidly as possible against yellow fever, the U. S. Public Health Service has announced.

This is one of several measures being taken to protect the United States from importation of the disease which has been proved to exist in Brazil, Paraguay, Bolivia, Peru, Ecuador, Colombia and Venezuela.

An officer of the U. S. Public Health Service has been detailed to do the vaccinating.

The anti-yellow fever vaccine is being supplied by the Rockefeller Foundation of New York in cooperation with the laboratory of the Rockefeller Institute of Medical Research in Rio de Janeiro, Brazil.

The vaccinations are being carried out as part of an agreement recently made between the Pan American Sanitary Bureau in Washington, D. C., and the Pan American Airways, Inc., and Pan American-Grace Airways, Inc.

Another measure agreed on by the airlines and the Sanitary Bureau is that all planes coming from South America will be thoroughly fumigated during the night with an insecticide made according to formula furnished by the U. S. Public Health Service. The morning prior to embarkation of passengers the planes will be opened and thoroughly ventilated.

Third part of the agreement relates to the certificate of origin which must be filled out and carried by each passenger embarking on any plane at any point north of 30 degrees south latitude, regardless of the direction of his voyage. This certificate tells, among other information, where the passenger has been for the six days prior to embarking on the plane.

Quarantine officers can thus learn whether or not the passenger has been exposed to yellow fever long enough before his arrival for the disease to develop if the passenger is infected. If the passenger is less than six days away from yellow fever regions, as is possible, he may be detained on arrival, or held under observation until there has been time for the disease to develop.

Similar agreements are expected to be made shortly between the Pan American Sanitary Bureau and other international airlines in the western hemisphere.

Science News Letter, September 11, 1937

PSYCHOLOGY

"Blue" Sounds Made Real In Psychological Tests

TO speak of "loud" colors or "blue" tunes is a commonplace, but to some it is not just a figure of speech thus to couple the messages brought to the brain by one sense pathway with those conveyed by an entirely different sense. This peculiarity of some individuals is known to psychologists as "synesthesia."

Whether the peculiarity can be learned, or whether you are "just born that way," was the subject of an experiment reported by Dr. T. H. Howells, of the University of Colorado. Those taking part were trained to associate red and green lights with certain tones, and then the intensity of the hues was gradually reduced until they were very pale. Then when the tone that had been associated with green was sounded with the red color, the observers were confused about the color. When white was shown with the "red" or "green" tones, the subjects reported the colors corresponding to the tones.

Science News Letter, September 11, 1937

SOCIOLOGY

More Illegitimate Children Cause Concern for Future

THE bar sinister has played an important part at many stages of human history. Except for psychological and social considerations, it does not matter particularly in many individual cases whether a child's parents happen to be married or not.

But illegitimate children do not turn out so well, on the average, as those who have no stigma attached to their origin. This is the opinion of Prof. S. J. Holmes and E. R. Dempster of the University of California, who, after careful studies of population figures conclude:

"There is no escape from the conclusion that larger and larger proportions of our population are coming to be of illegitimate origin."

Such a situation should be viewed with concern, in their opinion, because unmarried parents are recruited largely from occupational groups which have relatively low ratings on the scale of intelligence. Thus, an increase in illegitimacy dilutes the quality of the racial stream of life.

The financial depression which checked marriages and resulted in a certain amount of demoralization, is blamed in part for the rise in illegitimacy. The investigators believe that the ratio of illegitimate to legitimate births will probably increase so long as the general birth rate continues to decline. But there is hope that the increase in the number of illegitimate children born per thousand of population will be checked.

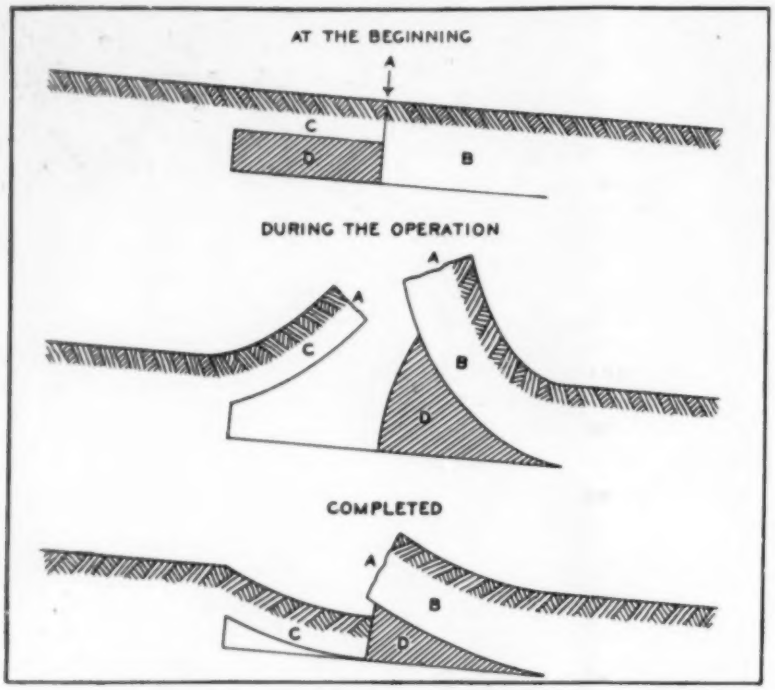
Science News Letter, September 11, 1937

PALEONTOLOGY

Ancient Cave Bears Had Dental Troubles

CAVE bears, favorite quarry of cave men in ancient Central Europe, had troubles of their own with their teeth. Studies by Dr. A. Kubacska of the Hungarian Academy of Sciences, on large collections of cave-bear jaws, show that these animals often suffered from tooth cavities, inflamed jaws, supernumerary and mal-erupted teeth, and other dental ailments. In this they contrasted sharply with the jaws of purely carnivorous animals which never show signs of such defects.

Science News Letter, September 11, 1937



HOW THE MECHANICAL MOLE WORKS

Meaning of the letters in these cross-section diagrams is as follows: A, vertical cut made by the rolling colter; B, 8-inch sod strip lifted, but not turned over, on downhill side; C, 4-inch sod strip lifted, but not turned over, on uphill side; D, 4 inches of soil thrown under downhill sod strip.

AGRICULTURAL ENGINEERING

Machine Builds Terraces Without Destroying Sod

A "MECHANICAL mole" that builds terraces on pasture hillsides without making dangerous breaks in the sod has been developed by engineers of the U. S. Soil Conservation Service and Iowa State College.

Earning its nickname because it does all its work underground, the new implement consists of a rolling colter to cut the sod and three different plowshares, all mounted on the same plow-beam and pulled by a 20 horsepower tractor. The four tools, acting in succession, cut the sod, lift the edge of the downhill side eight inches, shove the earth from the uphill side under it to keep it up, and drop the edge of the uphill sod to the bottom of the shallow trench thus made.

The "mole" is pulled around the hillsides on contour lines, so that the succession of hollow terraces catch and hold the rain, thereby preventing erosion and loss of lime and other essential nutrient elements. The only soil raised by the operation, along the raised edge of the downhill side of the cut sod, is soon grown over by grass from above and below, leaving the pasture secure again in its green armor.

Terracing has been carried on successfully with the "mole" on hillsides with slopes as great as 18 per cent.

Science News Letter, September 11, 1937

PLANT PHYSIOLOGY

Germination Inhibitors Hinted in Middle Ages

EXISTENCE of a substance in the flesh of fruits that inhibits the seed from sprouting too soon, only recently demonstrated by plant physiologists, was foreshadowed in the Middle Ages by the early scientist-saint, Albertus Magnus, who was a university teacher in Paris and Cologne.

Albertus wrote: "The moisture of apples, pears and similar fruits in no wise nourishes the seeds. And these, when they fall and germinate, do not gain their growth from the flesh of the fruit but from the earth. It is therefore to be concluded that the seeds germinate better if all the surrounding flesh is taken away, than if the seeds are left in it."

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ride," he told his audience," remain in solution until more than 75 per cent. of the water has evaporated."

Tests revealed that the lake is slightly alkaline. Additional experiments revealed that water from the Great Salt Lake contains only one-sixtieth or less as much bromide salts as ordinary sea-water. Bromide salts are valuable in medicine, the manufacture of photographic films and for anti-knock motor car fuels.

Liquid Helium in Quantity

A low-temperature plant to turn out a gallon of liquid helium per hour for use in vital scientific research was described by Prof. John G. Aston of Pennsylvania State College.

A "helium bomb" to allow a portion of some highly-compressed helium to expand, and in so doing take away heat from the remainder, liquefying that remaining portion, features the apparatus that will be placed in service shortly in the low-temperature laboratory of the Pennsylvania institution, Dr. Aston reported.

Liquid helium is one of the coldest substances known, boiling at a temperature of 452 degrees below zero Fahrenheit. Working temperatures of as low as 440 degrees below zero are obtainable by the use of liquid helium, Dr. Aston indicated.

Valuable studies of organic substances at temperatures from 440 degrees below zero up to their melting points are being carried out with equipment already in existence and using liquid air and liquid hydrogen as the cooling media. The helium plant will extend the range of temperatures.

The new helium equipment will make the Penn State laboratory one of the largest of its kind in the world. Comparable laboratories are located at the University of California at Berkeley, University of Toronto, and at Leyden, Holland, and Berlin.

Direct evidence of the existence of "zero point energy," one of the cornerstones of the scientist's picture of the way in which atoms work, was reported by Dr. Alexander Goetz of the California Institute of Technology.

A helium liquefier to chill atoms under test to 450 degrees below zero Fahrenheit linked to a spectroscope to analyze light and an X-ray machine were the tools Dr. Goetz used in his attempt to wrest from the atom further details of its life-history.

Atoms vibrate in a non-stop "dance of life" at ordinary temperatures, but when they are cooled the vibrations gradually slow down. Until a short time ago, it was thought that when absolute zero, the coldest temperature possible, 459.4 degrees below zero Fahrenheit, was reached they would stop altogether. Theory required, however, that there still be a very small bit of movement, "zero point energy," left over. Now Dr. Goetz has found additional means of finding and possibly measuring this tiny residue of energy.

New, sharp clear pictures of the way in which atoms are put together have been secured by means of the apparatus. X-rays passing through crystals are bent in different patterns according to the arrangement of atoms in the crystal. Such records have been made for many years, but Dr. Goetz has succeeded in getting clear photographs by cooling down the atoms and slowing down the vibration, which caused most of the photographs taken at room temperature to be somewhat foggy.

Pioneered Uranium Study

Prof. Auguste Piccard may be best known to most of us for his daring balloon ascensions to high altitudes seeking data on the elusive cosmic rays, but he was also an early leader in one of the controversies regarding the age of the earth. This new and little-known fact was revealed at the meeting of the section on geochemistry.

Prof. Aristid V. Grosse of the University of Chicago's department of chemistry credited the views of Prof. Piccard that the "patriarch" of all the radioactive elements—actino-uranium—played a very important role in the early history of the earth.

Prof. Grosse is well-known in chemical circles for his work on super-heavy elements beyond uranium in the periodic table.

In his current report Prof. Grosse analyzes all the available physical and chemical data on the role played by actinium in helping to fix, geologically, the earth's age by means of experiments on the rate of radioactive disintegration of the heavy elements.

Some geologists and chemists who have carefully determined the atomic weights by chemical means believe that the actinium series of elements was of little importance in the early history of the earth and, therefore, that corrections in geologic age measurements are not needed.

The other point of view, early expressed by Prof. Piccard in 1917, said Prof. Grosse, holds that actino-uranium disintegrates much more rapidly than uranium and although now practically all disintegrated was very important in the earth's earlier geological years.

The physical methods of determining atomic weights, said Prof. Grosse, definitely support the second point of view, that actinium really was an important factor during the earth's early years. The only evidence not in support of such work is the evidence obtained by chemical atomic weight measurements. The physical methods using the mass spectrograph appear superior, he indicated.

Greater Accuracy Needed

Prof. Grosse concluded that, "we chemists will have to reconcile ourselves with the fact that chemical atomic weight determinations although developed . . . to a state of precision perfectly satisfactory for orthodox chemical purposes, will have to give way to the still more accurate and reliable methods of the physicist in the future."

Chemistry teachers may soon begin introducing their students and the world at large to a brand new addition to the English language.

"Bas-cid" is the term and it refers to the base-forming or acid-forming properties of the elements.

A "bas-cid" scale as a part of the periodic table, the family chart of the 92 elements, was explained by Prof. Sidney J. French of Colgate University.

The scale, he said, is a part of a novel variation of the periodic table he has devised to make it easier for students to remember the elements, the A's, B's and C's of chemistry. The "bas-cid" scale will group together elements that form similar bases or similar acids.

Increasing "purity consciousness" on the part of the consumer has put pressure on research workers to devise new and faster, more accurate methods of analyzing commercial products, James S. Owens of the Dow Chemical Company told the chemists. He reported that analysis methods depending on the spectroscope, a device for analyzing light, were many times faster and more sensitive than other means in use.

Tiny quantities of impurities in drugs and other preparations, which the consumer demands shall show no color impurities, can easily be detected by the methods he and his colleagues have worked out.

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●RADIO

September 14, 4:15 p. m., E.S.T.

MENTAL HYGIENE OF WORK — Dr. George K. Pratt, psychiatrist of New York City.

September 21, 4:15 p. m., E.S.T.

WAR ON WEEDS—Dr. Earl Bressman of the U. S. Department of Agriculture.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

GENERAL SCIENCE

More Boys Than Girls Born, But They Die Off Faster

Sex, Evolution, Disease, Noise, and Many Other Topics Discussed at Meeting of British Association in Nottingham

SEX is equally distributed among Britons only in young people; between the ages of 15 and 19 the numbers of boys and girls are approximately equal. At earlier ages there are more males, later females predominate.

This seesaw of the sexes, and what it means biologically, was discussed before the meeting of the British Association for the Advancement of Science by Prof. F. A. E. Crew, noted biologist of the University of Edinburgh.

In a word, the female of the species is noticeably tougher than the male. Men, boys, and boy babies all tend to die off faster than their sisters.

Death Before Birth

It begins even before birth. For every 100 girl babies who die before they are born, there are 110 boy children who never see the light. Yet there are 106.5 boy babies born alive for every 100 girl babies. But then they proceed to die faster, during infancy and early childhood, until in the 'teen ages there are no more boys than there are girls.

After 20, young women begin to outnumber the men, and the ratio rises throughout the remainder of life. In the seventies and eighties far more women die than men, for the simple reason that far more women are left alive to die.

Deadly poisons released into the blood can be robbed of much of their viciousness by the injection of a very finely divided oil-and-water emulsion, Drs. A. C. Frazer and H. C. Stewart reported. As they phrased it:

"The administration of finely dispersed oil-in-water emulsion in toxemic conditions modifies the course of the disease to a marked degree . . . In the administration of vaccines and similar preparations the toxic reaction obtained with large doses can be avoided with emulsion prior to injection."

Outside the body, the same kinds of oil-in-water emulsions have been used experimentally to de-toxify bacterial toxins and even cobra venom. Ordinarily lethal doses so treated and then injected into guinea pigs failed to have the expectable deadly effect. Drs. Frazer and Stewart explain the de-toxifying powers of their emulsions as due to "adsorption of the toxin at the oil-water interface."

Evolution's much-disputed riddle, the inheritance of acquired characters, was rejected by the president of the British Association for the Advancement of Science, the noted entomologist Prof. Sir Edward B. Poulton, in his address at the opening of the Association's annual meeting.

Earlier advocates of this theory had put forth the idea that instincts are "inherited experience". Against this, Sir Edward set up examples of instinctive behavior that enable certain animal forms to survive only because they avoid a certain experience—the experience of being eaten.

Twig-imitating caterpillars escape being eaten by birds, so long as they are in their natural surroundings where they are not easily noticed. Against a light background they are quickly seen and snapped up.

Another example cited by Sir Edward was of a certain kind of fly in Africa, which as a larva takes elaborate precautions to fortify itself safely inside a little column of dried mud, from which it eventually emerges as an adult. Both these modes of action, and many others, he indicated, can hardly be considered based on anything that any of their ancestors ever experienced and transmitted to the descendants as "lapsed intelligence."

Noise-Proofing Buildings

Englishmen hate noise; and Britain is going to do something about it. So declared Dr. George W. C. Kaye, well-known physicist.

British architects and construction engineers are paying increasing attention to sound-proofing buildings and industrial engineers are devoting more study to eliminate noise at its source. The past few years in Great Britain have seen a concerted attack on the problem, he indicated.

Dr. Kaye, who is chairman of the Acoustics and Noise Committee of the British Standards Association and of the Ministry of Transport's Noise Investigation Committee, reported widespread progress in noise abatement.

He described the history of the "phon," a new unit for the measurement of noise, and reported that its standardization came in "the nick of time to meet the present demand for noise abatement."

Typical of British efforts to quiet a nation are methods adopted to cut down the noise of London's Underground, or subway. Asbestos-faced shields now line the tubes to within a few inches of clearance of the wheels. They absorb the roar of the wheels as they pass over track irregularities and rail joints. In addition, railgrinding cars to smooth the rails have been installed.

England's first noise abatement ordinance, Dr. Kaye recalled, dates back to the times of Good Queen Bess, when "Sounding of horns and beating of wives" was prohibited after nightfall.

Wells Wants Archaeology

H. G. Wells, perhaps best known as the author of works on history, urged abandonment of the teaching of what has hitherto been regarded as history. What he would substitute in the lower grades is more in the nature of archaeology-history of early man and the beginning and growth of civilization.

"The crazy combative patriotism that plainly threatens to destroy civilization today is very largely begotten by the schoolmaster and the schoolmistress in their history lessons," Dr. Wells said. "They take the growing mind at a naturally barbaric phase and they inflame and fix its barbarism."

Along with a broader history of the whole of mankind, Mr. Wells urged study of geography, using modern photography rather than maps and lists of capes and rivers. Biology should include the study of how man emerged from the sequence of sub-human animals, he said. In a world of machinery, optical instruments, electricity, radio, and so forth, we want to lay a sound foundation of pure physics and chemistry upon the most modern lines—for everyone, he declared.

Parents generally are proud and pleased when their offspring begin to run around the house, exploring, handling things. They even manage to be patient when little Precious pulls a corner of the tablecloth, precipitating ruin. But they are apt to become wearied and exasperated a little later, when the endless torrent of "Why?" begins to flow.

Yet the child's questions are just a means of orienting the youngster's life in a new and strange world, Dr. M. M. Lewis pointed out before the meeting. They serve two purposes; they are first play, then a social instrument, a means by which the child attempts to satisfy his needs.

Children's questions pass through three stages:

At first they are a means of dealing with the present situation, the one in which the child finds himself at the moment.

Then they begin to deal with absent situations, either past or future.

Finally they come to refer to merely possible situations. They are like the "hypothetical questions" of a lawyer. The child asks them to satisfy his curiosity. At first he uses them chiefly to check up on things he already knows. Then he makes them instruments for adding to his knowledge.

Tricks of the Color-Blind

Color-blind persons sometimes resort to very ingenious devices for overcoming their handicap and hiding it from others, Dr. Mary Collins, of the University of Edinburgh, told the Psychology Section of the Association in the course of her presidential address evaluating modern tests of color blindness.

One man who worked constantly with red and black ink was embarrassed by inability to tell one from the other. His difficulties were solved when he discovered that he could make the distinction by smell.

Another, who was a painter, had the much more difficult task of copying colored pictures when he was unable to tell green when he saw it. He matched the green of the foliage because he could recognize blue and yellow. He mixed the two, hoping the result might match the green of the original. He succeeded.

A color blindness test was beaten by an engineer by the device of accepting as correct matches those which looked all wrong to him.

Existing color blindness tests are satisfactory for excluding those with defective color vision from most occupations, Dr. Collins indicated. Those vocations requiring workers to distinguish between lights of red and green, such as railroads, the Navy, aviation and perhaps motoring, should use tests in which lights, and not just pigments, must be distinguished, she said.

Spirits of ancestors flit about in the form of moths. This odd belief is held by Fiji Islanders and also by natives of the Naga hills, in that southeast corner of Asia called Indo-China. So Prof. J. H. Hutton told British anthropologists at the meeting.

Head-hunters of Fiji wear the hair of an enemy's head—after they have got him, of course. And so do Naga head-hunters in Indo-China. In both places, if they don't want to speak right out about cutting off somebody's head, they refer to the victim pleasantly as a plantain tree.

If you are poor in this world, you'll be poor in the next, so they believe in both these places, over 5,000 miles apart. And if you are stingy, stay away from these two corners of earth, for they think stinginess the world's worst fault.

With such examples as these, reeled off by scores from his own travels and from studies of other scientists, Prof. Hutton piled up evidence that natives of Indo-China long ago had some cultural connection with natives, not only in the Fiji Islands, but also with natives in the Marquesas even farther away, and natives of Madagascar far south in the Indian Ocean. He advanced the theory that migrations of cultural ideas, if not of people, took place from some island center long ago, and spread in various directions, one ending in Indo-China.

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PHYSIOLOGY

Artificial Compound Has Sex Hormone Effects

DISCOVERY of another artificial sex stimulant simulating the effect of oestrone, one of the sex hormones, has been reported by J. M. Robson and A. Schoenberg of the University of Edinburgh.

Triphenyl ethylene, a relatively simple organic substance, served to arouse five of ten mice whose ovaries had been removed, the two scientists declared. Its effect, however, is only 1/10,000 that of the real hormone.

Science News Letter, September 11, 1937

The coney, a little animal about the size of a rabbit, is a near relative of the elephant.

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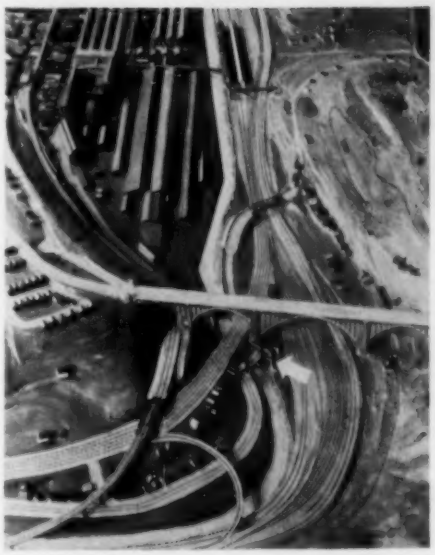

ENGINEERING

$500,000 "One-Way Street" Built for Flood Control

CONSTRUCTION of a "one-way street" to keep the flood waters of the Monongahela River out of the huge Westinghouse Electric works in East Pittsburgh has been started. It is the first flood control project since last year's flood disaster to reach the construction stage.

The normal flow of Turtle Creek, which flows through the plant, will be maintained at the same time that flood gates keep out a flood backwash from the Monongahela. Two gates, one 80 feet long by 30 feet high and the other 40 feet by 20 feet, will prevent the Monongahela from backing up, while pumps with a capacity of 7,500 cubic feet of water a second keep Turtle Creek flowing against the flood.

Science News Letter, September 11, 1937

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ECONOMIC BOTANY

Ethiopian Trees May be Tapped for Motor Fuel

GEOLOGIST and chemist have cooperated toward the solving of the motor-fuel problem, working on petroleum in most parts of the world, on coal in hard-pressed Germany. But in Italy's recently conquered province of Ethiopia the botanist may have to step into the geologist's place.

Italy's need for motor fuel in Ethiopia is immediate and pressing. Motor transport is about the only practicable means for the commercial exploitation of the country in the immediate future. The one railway line is inadequate, and it ends in an alien seaport. Airplanes obviously cannot handle bulk freight. The truck is the only practicable answer.

But all gasoline and oil have to be imported—and prices are terrific. Ethiopia's dreamed-of oil fields have not yet been found, ardent though the search has been.

Alcohol, the quickest answer of oil-less lands to the liquid fuel problem, is a possibility. Corn and millet, good basic stuffs for fermentation, are raised abundantly. Also, there is a tremendous surplus of palm nuts known as vegetable ivory, which can be converted into a kind of sugar and thence into alcohol. A million gallons a year can be made from these nuts, it is estimated.

But an even better resource appears to reside in the millions of weird, cactus-like plants called candelabrum euphorbias, that grow all over the country. The milky sap of this species is said to yield some 60 per cent of a gasoline-like liquid upon a relatively simple chemical treatment. Combined with ivory-nut alcohol this "vegetable gasoline" holds out a hope to the worried Italian engineers.

At any rate, they are going to try it. The Italian Fuel Commission is arranging for the construction of an ivory-nut alcohol distillery and a euphorbia-"gasoline" refinery at Agordat, which is the center of ivory-nut production and also has ready access to large forests of candelabrum trees. Agordat also has the advantage of being on a main highway to Adis Ababa, where fuel-hungry trucks pass in fleets every day.

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MARINE BIOLOGY

Swarming Life Collected On Wood-Cement Blocks

MORE than 180 distinct species of plant and animal life attached themselves to wood-cement blocks and glass plates lowered into the sea from the thousand-foot pier of the Scripps Institution of Oceanography at La Jolla, Calif., in studies made by Drs. W. R. Coe and W. E. Allen. The forms included, among others, 15 kinds of seaweed, 88 species of one-celled plants and animals together with sponges, worms, barnacles, ascidians or sea-squirts, and the California oyster. Drs. Coe and Allen describe the experiments in detail and suggest practical significances, in a special bulletin of the Institution.

Science News Letter, September 11, 1937

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ORNITHOLOGY

NATURE RAMBLINGS
by Frank Thone

Speed of Birds

"SWIFT as a swallow" used to be the conventional conception of top-limit speed, back in old romantic days. Forty years ago a German observer on Heligoland estimated speeds of three or four miles a minute even for small birds. But sober science, stopwatch in hand, is bringing reality to displace fancy in estimates of bird speeds through the air.

In a new circular of the U. S. Department of Agriculture Miss May Thacher Cooke of the Biological Survey tabulates all modern estimates of bird speeds she has been able to find in print anywhere.

The means used were various: speedometers of parallel-speeding or pursuing automobiles, stopwatch observations while birds flew known distances, theodolites, in a few cases the air-speed indicators of airplanes. The birds were clocked under all kinds of conditions: fleeing in terror from pursuing autos, hawks stooping at their prey, or birds of all kinds just cruising along at ordinary speeds. Observations were taken by scores of observers, all over the world.

The swallow, speed king of poetic romancing, turns out to be a rather ordinary performer, with speeds between 24 and 42 miles an hour. Other small birds, ranging from orioles and larks to catbirds and sparrows, had speeds within that range; in some instances below it, to as little as 12 miles an hour.

Hummingbirds live up to our impressions of their swiftness, showing speeds of 45 and 55 miles an hour, apparently without being pushed. The same speeds seem to rule for the much larger birds, ducks, geese, and swans. However, pintail ducks pursued by airplanes, which must have seemed like dreadful monster hawks to them, got their speedometers up near the 70-mile mark.

Swiftest of all birds on the wing are those of the hawk and eagle group. Duck hawks have been timed at 175 to 180 miles an hour; a golden eagle, observed in Scotland, held to the more conservative speed of 120 miles an hour. On the other hand, the ability of these birds and others to soar makes it possible for them to stay aloft at very low speeds, such as 15 to 21 for turkey vulture, and as low as 12 miles an hour for soaring gulls.

Some observations on running speeds are also recorded. The record is held by an emu, pursued for ten miles by motorists in Australia. The bird worked up a speed of 31 miles an hour, but could not be made to exceed that figure.

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MATHEMATICS

1, 2, 3...Wonder of Numbers Made Simple for Children

OUR numerals came from India, not from the Arabs.

Myriad means 10,000 and it was the largest number for which there was a name in ancient Greece.

Many such interesting facts can be learned from the latest book by Dr. David Eugene Smith, Columbia University's famous mathematician and authority on the history of this science. No, it is not a scientific treatise but a delightful book for children, *The Wonderful Wonders of One-Two-Three.*

About why our Arabic numerals are misnamed: An Arab teacher about a thousand years ago wrote by hand an arithmetic with the numerals like those of India. The book was taken to Europe where merchants and others were struggling with the I, V, and X's of Roman numerals. So when the numerals we now have came into use because they were more easily used, they were called Arabic, even though the Arabs never used them and do not do so today.

Why do we count by tens? The answer is found in our fingers and toes. Dr. Smith says we would be counting by 8's if people were born with four fingers on each hand. Even today many of us use our fingers for counting.

Why do we give "three cheers" and why are there seven days in the week? Because 3 and 7, along with 5, are the prime numbers below ten, that is numbers that can not be divided by anything. Prime numbers were considered mysterious and divine in olden days.

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HERPETOLOGY

Snakes Used in Medicine In Many Lands and Ages

SERPENTS twain wreathed the staff of Aesculapius, classic patron of medicine; a brazen serpent upraised in the desert healed the stricken Israelites.

How deeply entwined with medical lore everywhere and in all times is the subtle snake, Clifford H. Pope bears witness in his new book, *Snakes Alive.*

We are used to hearing, in a superior sort of way, about the weird ingredients of native Chinese drug-messes, and so are not surprised to learn that the Chinese pharmacopeia includes snake "slough, skin, bile, flesh, fat and oil, head, eyeballs, eggs, and bones." Yet "snake oil" is still a widely sold commodity in these Enlightened States of America—and it is usually faked at that! Federal seizure and condemnation of "rattlesnake oil liniment" that contained "little if any snake oil" is a matter of recent record. And in France a "treacle" of snake-ingredients survived as an official remedy as late as 1884.

Two hundred years ago, a favorite English remedy for scurvy was "viper bread," which contained powdered viper's flesh and sarsaparilla, while for inducing a sweat physicians recommended "compound tincture of vipers" which was declared very successful in the Great Plague of London in 1665.

In 1685 Madame de Sévigné, one of the most cultured of Frenchwomen, recommended vipers in one of her letters:

"They temper, purify, and refresh the blood. But real flesh must be used, not the powder. Ask M. de Boissy to send you ten dozen vipers. . . . Take a couple every morning, cut off the heads, have them skinned and chopped up and stuffed in a chicken. Do this for a month, and then blame your brother if M. de Grignan does not become as well as we could wish him to be."

Science News Letter, September 11, 1937

Books

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•First Glances at New Books

Entomology

THE WONDER WORLD OF ANTS—Wilfrid S. Bronson—*Harcourt, Brace,* 87 p., illus., $1.50. Bronson's done it again! One would think that ants have been just about written to death, but such is the charm of Bronson's style, both as a writer and (especially) as an artist, that it's all fresh and new again. The author-artist is, as usual, particularly happy in his cleverly presented mechanical and anthropoeic analogies.

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Zoology

PERKEY: A BIOGRAPHY OF A SKUNK—Agnes Akin Atkinson—*Viking,* 100 p., illus., $1.50. If you're inclined to persecute animals you don't understand, because you're afraid of them, this is a book you should read. Skunks are thoroughly peaceable and goodnatured folk, only the senseless hostility of humankind (and our greed for their beautiful pelts) has erected the mephitic barrier between our two species. The Atkinsons, who made guests of a skunk family, studied, photographed, wrote them up, have done both species a real service.

Science News Letter, September 11, 1937

Zoology

ANIMAL TREASURE—Ivan T. Sanderson—*Viking,* 325 p., illus., $3. Adventure and misadventure, romance and hard work, in a collecting trip in West Africa to get small mammals. The story is charmingly told and as charmingly illustrated.

Science News Letter, September 11, 1937

Geography

RICHARD HALLIBURTON'S BOOK OF MARVELS: THE OCCIDENT—Richard Halliburton—*Bobbs-Merrill,* 314 p., illus., $2.50. From roaring Manhattan to the depths of the Brazilian jungle, from the holy portals of Rheims Cathedral to the massive gates of commerce at Panama, the owner of the world's most restless pair of feet takes us. With masterfully taken photographs well reproduced and a rush of compelling words he makes us share his travels. Junior readers will "eat up" this book—if they can get it away from their elders.

Science News Letter, September 11, 1937

Sociology

MANUAL FOR SOUTHERN REGIONS: TO ACCOMPANY SOUTHERN REGIONS OF THE UNITED STATES, by Howard W. Odum—Lee M. Brooks—*Univ. North Carolina,* 194 p., illus., $1. Designed as an aid to the study of the author's penetrating sociological work, *Southern Regions of the United States,* this book consists mostly of questions. Some of them are very disquieting questions. Many a reader will be roused to wonder (and mayhap wrath) that so much can be amiss in so fair a land. And other readers (North as well as South) may add a question of their own: Is it I?

Science News Letter, September 11, 1937

Scientific Study

THE ELEMENTS OF RESEARCH—Frederick Lamson Whitney—*Prentice-Hall,* 616 p., $3.50. Every professor who has a student or two that look as though they "might do for research men" should make this book required reading in the Senior year. It tells what research is about, in all fields from the abstractest philosophy to the concretest science, outlines requirements both material and mental, and tells something of the logic-mechanics of the process. Short bibliographies appended at section-ends, and additional literature references introduced as copious footnotes, give many more windows upon the world of learning.

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Bibliography

THE BEST BOOKS OF THE DECADE, 1926-1935—Asa Don Dickinson—*Wilson* 194 p., $2. The greater part of the book consists of thumbnail biographies of the selected authors, with equally brief abstracts of their books. This is followed by listings of the books by categories. Nineteen titles are in science, mostly general-survey books of the Jeans and Eddington type.

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Agriculture

A HISTORY OF AGRICULTURAL EXPERIMENTATION AND RESEARCH IN THE UNITED STATES, 1607-1925, INCLUDING A HISTORY OF THE UNITED STATES DEPARTMENT OF AGRICULTURE—Alfred Charles True—*Govt. Print. Off.,* 321 p., 25 c. A history of agriculture in so few pages must necessarily be severely condensed; but within the limitations thus imposed this is a remarkably complete book. It is especially valuable for its exact and authentic chronicle of official acts and events. There is a bibliography of 327 titles.

Science News Letter, September 11, 1937

Botany

RANGE PLANT HANDBOOK—Forest Service, U. S. Dept. Agriculture—*Govt. Print. Off.,* 816 p., illus., $2.50. Designed primarily for field use by managers of public and private range lands, in recognizing and evaluating the species they encounter, this book will serve its purpose magnificently. Every significant species of the western Prairies, the Plains, and the mountain country—grasses and sedges, forbs and shrubs, useful species and weeds—receives complete treatment. There is a complete description, with detailed illustration, together with full discussion of their ecology and economic significance. But the use of this book will not stop with range managers. The Superintendent of Public Documents might as well get set for a lot of orders from teachers and research botanists.

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Meteorology—Climatology

AN INTRODUCTION TO WEATHER AND CLIMATE—Glenn T. Trewartha—*McGraw-Hill,* 373 p., illus., $3. A few years ago there were no good meteorology textbooks at all, now the need becomes increasingly well supplied. Newest among the worthy entries is this book of Prof. Trewartha's. The first half is mainly meteorology, oriented around the new air-mass analysis method; the second half is a discussion of principal climatic types and their distribution.

Science News Letter, September 11, 1937

Ornithology

CONCORD RIVER: SELECTIONS FROM THE JOURNALS OF WILLIAM BREWSTER—Smith O. Dexter, ed.—*Harvard,* 259 p., illus., $3.50. A man who loved birds sensitively, observed them acutely, wrote about them compellingly in a journal that makes him a worthy successor to great souls like Burroughs and Thoreau. "Lovely" is not an excessive word for the illustrations.

Science News Letter, September 11, 1937

Mathematics—Juvenile

THE WONDERFUL WONDERS OF ONE-TWO-THREE—David Eugene Smith—*McFarlane, Warde, McFarlane,* 47 p., illus., $1. See page 175.

Science News Letter, September 11, 1937

Herpetology

SNAKES ALIVE AND HOW THEY LIVE—Clifford H. Pope—*Viking,* 238 p., illus., $2.50. See page 175.

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